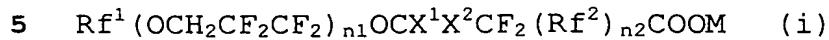


CLAIMS

1. A fluoroalkylcarboxylic acid derivative which is represented by the general formula (i):



wherein Rf^1 represents a straight or branched fluoroalkyl group containing 1 to 20 carbon atoms, which fluoroalkyl group may optionally contain 1 to 5 oxygen atoms in the principal chain thereof, Rf^2 represents a straight or branched fluoroalkylene group containing 1 to 25 carbon atoms, said fluoroalkylene group may optionally contain 1 to 5 oxygen atoms in the principal chain thereof, $n1$ represents an integer of 0 to 3, $n2$ represents an integer of 0 or 1, X^1 and X^2 are the same or different and each represents hydrogen atom or fluorine atom, and M represents NH_4 or a monovalent metal element.

2. A fluoroalkylcarboxylic acid derivative which is represented by the general formula (ii):



wherein Rf^1 represents a straight or branched fluoroalkyl group containing 1 to 20 carbon atoms, said fluoroalkyl group may optionally contain 1 to 5 oxygen atoms in the principal chain thereof, Rf^2 represents a straight or branched fluoroalkylene group containing 1 to 25 carbon atoms, said fluoroalkylene group may optionally contain 1 to 5 oxygen atoms in the principal chain thereof, $n1$ represents an integer of 0 to 3, $n2$ represents an integer of 0 or 1, X^1 represents hydrogen atom or fluorine atom, and M represents NH_4 or a monovalent metal element.

3. The fluoroalkylcarboxylic acid derivative according to Claim 1 or 2,

wherein Rf^1 is a straight or branched fluoroalkyl group containing 1 to 7 carbon atoms,

said fluoroalkyl group may optionally contain 1 to 3 oxygen atoms in the principal chain thereof.

4. The fluoroalkylcarboxylic acid derivative according to Claim 3,

wherein Rf¹ is CF₃-, CF₃CF₂-, CF₃CF₂CF₂-, (CF₃)₂CF-, CF₃CF₂CF₂CF₂-, CF₃CF₂CF₂OCF(CF₃)CF₂-, HCF₂CF₂CF₂- or CF₃OCF(CF₃)CF₂-.

10 5. The fluoroalkylcarboxylic acid derivative according to Claim 1, 2, 3 or 4, wherein n1 is 0 (zero).

15 6. The fluoroalkylcarboxylic acid derivative according to Claim 1, 2, 3, 4 or 5, wherein Rf² is -CF₂OCF₂-, -CF₂(OCF(CF₃)CF₂)_{n3}OCF(CF₃)- (in which n3 represents an integer of 0 to 4) or -CF₂(OCF(CF₃)CF₂)_{n4}(CF₂CF₂)_{n5}- (in which n4 represents an integer of 0 to 5 and n5 represents an integer of 0 to 5 provided that n4 and n5 satisfy the relation 3 x n4 + 2 x n5 ≤ 20).

20 7. The fluoroalkylcarboxylic acid derivative according to Claim 1, 2, 3, 4, 5 or 6, wherein n2 is 0 (zero).

25 8. A surfactant which comprises the fluoroalkylcarboxylic acid derivative according to Claim 1, 2, 3, 4, 5, 6 or 7.

30 9. A method of producing a fluoropolymer, wherein the fluoroalkylcarboxylic acid derivative according to Claim 1, 2, 3, 4, 5, 6, 7 or 8 is used as a surfactant in carrying out a polymerization in an aqueous medium.

10. The method of producing the fluoropolymer according to Claim 9,

wherein the fluoroalkylcarboxylic acid derivative is used in an amount of 0.0001 to 20% by mass relative to the
5 aqueous medium.

11. A fluoropolymer aqueous dispersion,

wherein a particle comprising a fluoropolymer is dispersed in an aqueous medium in the presence of the
10 fluoroalkylcarboxylic acid derivative according to Claim 1, 2, 3, 4, 5, 6 or 7 or the surfactant according to Claim 8.

12. A fluoropolymer powder which is obtained by

coagulating the fluoropolymer aqueous dispersion according
15 to Claim 11.

13. A fluoropolymer aggregate obtained by coagulating the fluoropolymer aqueous dispersion according to Claim 11, which is a polytetrafluoroethylene powder, a powder or a
20 pellet each comprising a melt-processible resin, or a coagulation comprising an elastomeric polymer.

14. A film/membrane which is obtained by coating,

impregnation or cast film formation using the fluoropolymer
25 aqueous dispersion according to Claim 11.

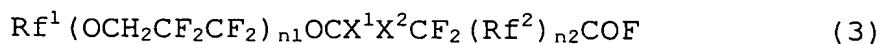
15. A molded article which is obtained by molding using the fluoropolymer powder according to Claim 12 or the fluoropolymer aggregate according to Claim 13.

30

16. A method of producing a fluoroalkylcarboxylic acid derivative,

which comprises producing the fluoroalkylcarboxylic acid derivative according to Claim 1, 2, 3, 4, 5, 6 or 7 by
35 converting a fluorocarboxylic acid fluoride represented by

the general formula (3):



wherein Rf^1 , Rf^2 , $n1$, $n2$, X^1 and X^2 are as defined hereinabove, to a fluorocarboxylic acid salt.

5

17. The method of producing the fluoroalkylcarboxylic acid derivative according to Claim 16,

wherein the conversion of the fluorocarboxylic acid fluoride represented by the general formula (3) to the

10 fluorocarboxylic acid salt is carried out by

(A) a method comprising converting the terminal -COF group in said general formula (3) to -COOH by hydrolysis using an acid and converting the -COOH to -COOM by neutralization with an alkali,

15 (B) a method comprising esterifying the terminal -COF group in said general formula (3) and, after separation of the ester, converting the ester moiety to -COOM by saponification, or

(C) a method comprising esterifying the terminal -COF group in said general formula (3) and, after separation of the ester, converting the ester moiety to -COOM by saponification, then converting the latter to -COOH using an acid and then converting this to -COOM by neutralization with an alkali.

25

18. The method of producing the fluoroalkylcarboxylic acid derivative according to Claim 16 or 17,

wherein the fluorocarboxylic acid fluoride represented by the general formula (3) is represented by said general

30 formula (3) in which $n2$ is 1, and

said fluorocarboxylic acid fluoride represented by the general formula (3) is produced by reacting an intermediate fluorocarboxylic acid fluoride represented by the general formula (2):



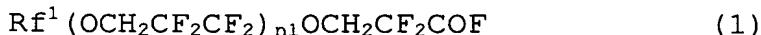
wherein Rf^1 , $n1$, X^1 and X^2 are as defined above, with tetrafluoroethylene and iodine in an aprotic polar solvent to thereby convert the terminal $-COF$ in said general formula (2) to $-CF_2OCF_2CF_2I$, followed by further conversion of the latter to $-CF_2OCF_2COF$ by reaction with oleum, or said fluorocarboxylic acid fluoride represented by the general formula (3) is produced by converting the terminal $-COF$ in said general formula (2) to $-CF_2(OCF(CF_3)CF_2)_pOCF(CF_3)COF$ [p being an integer of 0 to 5] by addition of hexafluoropropylene oxide, converting the terminal $-CF(CF_3)COF$ to $-CF(CF_3)I$ via $-CF(CF_3)COI$ and converting $-CF(CF_3)I$ to $-CF(CF_3)(CF_2CF_2)_qI$ (q being an integer of 1 to 5), followed by further conversion to $-CF(CF_3)(CF_2CF_2)_{q-1}CF_2COF$.

15

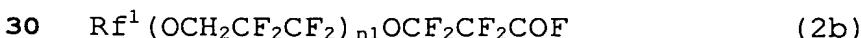
19. The method of producing the fluoroalkylcarboxylic acid derivative according to Claim 16, 17 or 18, wherein the intermediate fluorocarboxylic acid fluoride represented by the general formula (2) is a second intermediate represented by the general formula (2a):



wherein Rf^1 and $n1$ are as defined above, as obtained by monofluorinating a first intermediate represented by the general formula (1):



wherein Rf^1 and $n1$ are as defined above, or a third intermediate represented by the general formula (2b):



wherein Rf^1 and $n1$ are as defined above, as obtained by difluorinating said first intermediate.

20. The method of producing the fluoroalkylcarboxylic acid derivative according to Claim 16, 17, 18 or 19,

wherein Rf^1 represents a straight or branched fluoroalkyl group containing 5 to 7 carbon atoms, said fluoroalkyl group may contain 1 to 5 oxygen atoms in the principal chain thereof.